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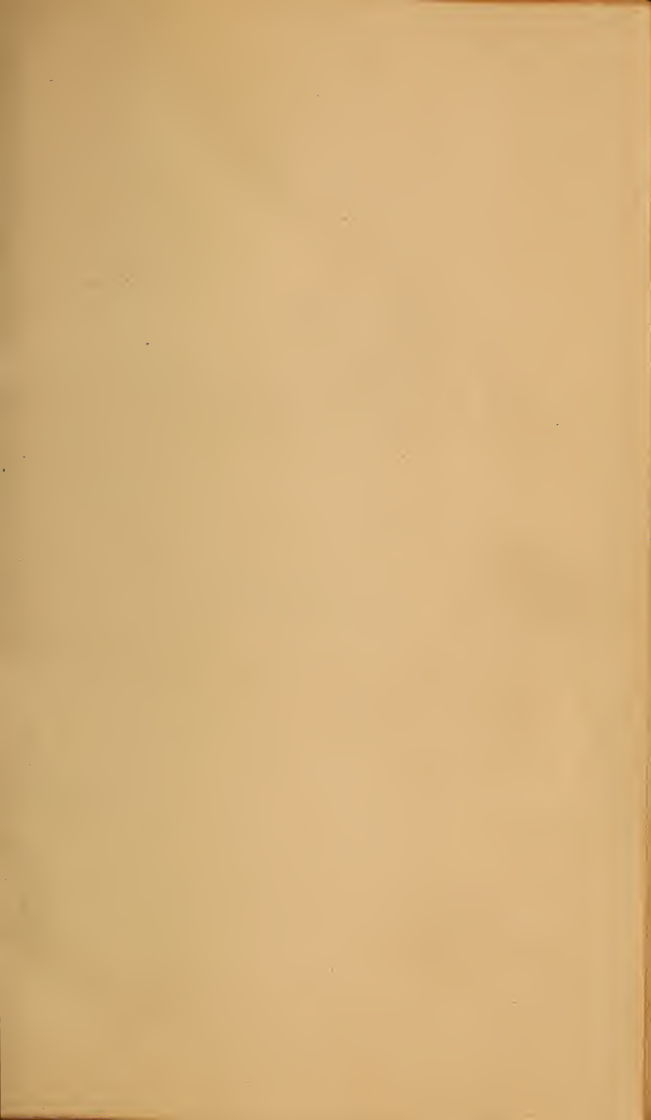
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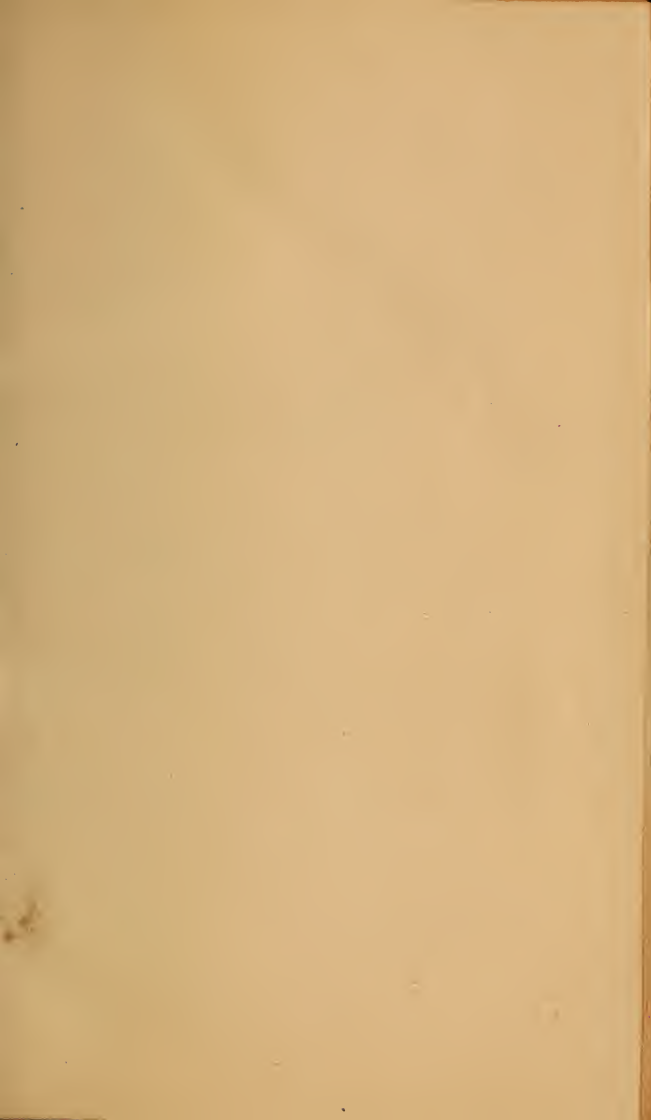
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C
IRVING'S
C A T E C H I S M

O F
B O T A N Y :

CONTAINING A DESCRIPTION OF THE MOST
FAMILIAR AND INTERESTING PLANTS,

ARRANGED ACCORDING TO THE LINNÆAN SYSTEM.

WITH
AN APPENDIX,
ON THE
FORMATION OF AN HERBARIUM.

THIRD AMERICAN EDITION, REVISED AND IMPROVED,

By M. J. KERNEY, Esq.

Author of Compendium of Ancient and Modern History, &c. &c. &c.

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Adapted to the use of Schools in the United States.

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## EXPLANATION OF THE PLATE.

THE divisions, *a*, *b*, *c*, &c., represent the different parts of the wall-flower: *a*, the flower; *b*, the pistil and stamens; *c*, the seed-vessel opened, and the bottom part of the receptacle; *d*, the calyx, or cup; *e*, the corolla, or blossom; *f*, a stamen magnified; *g*, the pistil magnified.

CLASS.

1. A Flower of the *Hippuris Vulgaris*—Com. Mare's-tail.
2. ————— *Veronica Beccabunga*—Brooklime,  
Speedwell.
3. ————— *Valeriana Officinalis*—Great wild Va-  
lerian.
4. ————— *Hex Aquifolium*—Common Holly.
5. ————— *Atropa Belladonna*—Deadly Night-  
shade.
6. ————— *Lilium Candidum*—Com. White Lily.
7. ————— *Æsculus Hippocastanum*—Horse-  
Chestnut.
8. ————— *Chlora Perfoliata*—Yellow Centaury.
9. ————— *Butomus Umbellatuc*—Flowering  
Rush.
10. ————— *Dianthus Caesius*—Mountain Pink.
11. ————— *Sempervivum Tectorum*—Common  
Houseleek.
12. ————— *Rosa Canina*—Common Dog Rose.
13. ————— *Pepaver Rhæus*—Com. Red Poppy.
14. ————— *Lamium Album*—White Dead Nettle.
5. ————— *Cheiranthus Cheiri*—Common Wall-  
Flower.
6. ————— *Malva Sylvestris*—Common Mallow.

17. A flower of the *Lathyrus Odoratus*—Sweet Pea.
18. ————— *Hypericum Androsaemum*—Tutsan.
19. ————— *Bellis Perennis*—Common Daisy.
20. ————— *Orchis Masculula*—Early purple orchis.
21. Flowers of the *Quercus Robur*—Common Oak tree,  
(magnified) two having stamens only, and two  
with pistils only.
22. Two catkins, from different plants of the *Salix Ar-  
gentea*—Silky Sand-Willow; one bearing flowers  
with stamens, the other with pistils.
23. Three flowers (magnified) of the *Atriplex Patula*—  
Halberd-leaved Orache; one perfect, one with sta-  
mens only, and the other with a pistil only.
24. 1. A mushroom. 2. Moss. 3. Lichen. 4. Sea-weed.

## P R E F A C E .

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THE long established reputation of IRVING'S CATECHISMS, precludes the necessity of adding any comments on their merits. The very extensive circulation, which they have had, not only in England, but also in this country, is the best proof of their utility. The plan of his works, is the very best that could be adopted. The Catechetical form of instruction, is now admitted, by the most experienced teachers, to be the best adapted to the nature and capacity of youth;—a system, by which children will acquire a knowledge of a science, in less time, than by any other.

As an introductory work, the present number on Botany will be found to possess peculiar merits. It presents to the mind of the pupil, a clear and concise view of the whole science of Botany. In a few words, it unfolds the beauty of the science, and points out the many advantages to be derived from the study.

The present edition has been carefully revised, and considerably enlarged. The various improvements, which the genius of modern authors have added to the science, have been introduced.

These improvements, it is believed, will render the edition, which is now presented to the public, much more valuable than any former edition.



# CATECHISM OF BOTANY.

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## CHAPTER I.

### INTRODUCTION.

How pleasing the task to trace a Heavenly power,  
In each sweet form, that decks the blooming flower,  
And climb the heights of yonder starry road,  
And rise through nature, up to nature's God.

Q. WHAT is Botany?

A. Botany is the science, which teaches us the knowledge of plants and vegetables, the arrangement of their several kinds, and their various medicinal, or noxious qualities.

Q. What are the advantages to be derived from the study of Botany?

A. A knowledge of this science, enables us to distinguish between such vegetables, or plants as are noxious, and those that are useful for food, or for other purposes of life.

Q. What other advantage has this science?

A. Study of Botany is in a high decree interesting. It moreover contributes to our health, as it often attracts to the country, and renders us acquainted with the wonderful works of nature. It also enlarges our minds, by affording

us new and useful ideas, and fills us with the most exalted admiration of the great Creator of the Universe.

Q. What productions of nature are comprehended in the appellation of plants and vegetables?

A. Plants and vegetables are bodies, that grow out of the earth; they are supported by air and food, endowed with life, and subject to death, but incapable of voluntary motion.

Q. What is the number of plants known at present?

A. Botanists have discovered upwards of 20,000 different species of plants.

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## CHAPTER II.

### *The Process of Vegetation.*

Q. OF what are plants, or vegetables composed?

A. When subjected to chemical analysis, they are found to contain calcareous *earth*, *oil*, *water*, and *air*, with a small quantity of *iron*, to which last substance, they owe their beautiful colors.

Q. What is the first process in vegetation?

A. The seed of a plant being committed to the ground by nature, or by the hand of man,

swells by the moisture it imbibes, and in a few days throws out two shoots; the first of which strikes downwards into the soil, and forms the root; and the other forces its way into the air.

Q. What are the different parts of a plant?

A. A perfect plant consists of the root, the trunk or stem, the stalks, the leaves, the flower, and the fruit.

Q. What are the functions of the root?

A. The root serves to fix the plant, and to imbibe nourishment from the earth for its support.

Q. What names are given to it, according to its duration?

A. Roots are called *annual*, when they are produced only once a year, as oats, barley, &c.: they are *biennial*, when they are produced in one year, and flourish the next, as wheat; and *perennial*, when they last for many years, as trees.

Q. Of what does the root consist?

A. The root generally consists of two parts; the body and the fibres: the latter is the part which imbibes nourishment; and as its powers are dormant during the winter, that season is most proper for transplantation.

Q. What are the different kinds of roots?

A. Roots are of various kinds; such as the *bulbous*, *tuberos*, *spindle*, *fibrous*, &c.

Q. Can you give an example of these roots?

A. The root of the onion is *bulbous*; that

of the potato, tuberoses; that of the carrot and radish, spindle; grass and trees, have fibrous, or branching roots.

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### CHAPTER III.

#### *The Structure of Plants.*

Q. WHAT is the trunk or stem?

A. The trunk or stem, is that part of a plant which produces the leaves and flowers, and serves to elevate them above the ground.

Q. Of what parts is it composed?

A. The trunk or stem consists of the cuticle, or exterior thin covering, answering to the skin of animals; the outer and inner bark; the wood: and the pith.

Q. Of what utility is the bark?

A. The outer bark serves to protect the plant from the effects of cold; and the inner bark, or liber, is the part in which the vital principle of a plant is chiefly seated.

Q. How is the wood formed?

A. The wood is a compact fibrous substance, formed by new layers, which are added every year from the innermost part of the bark; so that the age of a tree or shrub, may be ascertained, by the number of ligneous circles, which appear upon cutting the stem close to the root.

Q. What are the nature and functions of the pith?

A. The pith is a tolerably firm, juicy substance, which is diffused through the plant, to give energy and vigor to the whole: it is most abundant in young plants, diminishes as they grow up, and at length totally disappears.

Q. What is the sap?

A. The sap is the fluid which nourishes the plant, and is as it were the blood from which the whole body derives life.

Q. By what means does it perform its functions?

A. The fluids, destined to nourish the plant, being absorbed by the root, and become sap, are carried up into the leaves and branches, by the action of heat, through a number of longitudinal tubes in the wood, placed round the centre or pith.

Q. Is it found in the plant during the whole year?

A. The sap is forced down into the root by the severity of winter; but, when the cold subsides, it ascends in the trunk or stem, as may be seen by breaking a vine branch before the leaves appear, when it will flow in large drops.

Q. What are the stalks?

A. The stalks are those parts of a plant which bear the leaves, flowers, or fruits; as, the straw in grasses. That which supports

the flower, or fruit, is sometimes called, the *stem*. The strings of peas, beans, &c., are called *tendrils*.

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## CHAPTER IV.

### *The Buds and Leaves.*

Q. WHAT is the bud?

A. The bud is that part of a plant which contains the future shoot, wrapt up in scales, and protected from external injuries, till the season is fit for its expansion.

Q. How are they formed?

A. Buds are formed during the summer, and consist of small leaves, closely enveloping each other, and often protected against wet and cold, by an external guard of a gummy, resinous, or woolly substance.

Q. What do you remark of the leaves?

A. The leaves, which differ much in the variety and elegance of their form, consist of an immense number of fibres or nerves, divided into two sets, one belonging to each surface.

Q. How do they perform their functions?

A. The surface of the leaf being full of minute pores or holes, it imbibes the dew, air, &c., necessary for the growth of the plant;



it also exposes the sap, which it receives from the wood, to the action of the air, and returns it to the bark by its fibres or vessels.

Q. For what purposes are the leaves designed?

A. Leaves serve to nourish and prepare the buds of the future shoots, which are always formed at the base of the leaf-stalk; and to shade them, as well as the fruit, from the too powerful heat of the sun, which would dry up their moisture, and prevent them from coming to maturity.

Q. What else is remarkable of leaves?

A. Leaves always turn towards the light; they also give out moisture: and it has been ascertained, that healthy vegetables perspire water, by the under surface of their leaves, equal to one-third part of their weight every twenty-four hours.

Q. Are there not many different kinds of leaves?

A. Botanists enumerate above 100 distinctions of leaves, according to their position and form: their color is almost universally green; but the upper and under surfaces commonly differ in hue, as well as in kind or degree of roughness.

NOTE.—It has been proved, by experiments with the air pump, that if leaves be deprived of air, the whole plant will die. In all countries where there is almost perpetually a burning sun, scarcely any trees lose their leaves, because they require them for shade.

## CHAPTER V.

*Secretions, Odor, and Color of Plants.*

Q. WHAT is meant by the secreted fluids of plants?

A. The sap, when exposed to the action of the air, light, and heat, by the leaves, becomes a new fluid, which, assuming the peculiar flavors and qualities of the plant, has obtained the name of secretions.

Q. Mention the most distinct secretions of vegetables?

A. Gum is a secretion, which oozes from the plum, cherry, and other trees, in the form of large drops or lumps; rosin and turpentine are of the same nature; also the milky juice of the fig, poppy, &c.

Q. What other natural substances are found in vegetables?

A. Sugar is procured from the sugar-cane, beet, carrots, &c.; tar, from the bark of trees; oils, from the seeds, or kernels of olives, almonds, linseed, &c.; and wax is extracted from all flowers by bees.

Q. From what does the odor, or smell of plants proceed?

A. The odor of plants is a volatile oil of a resinous nature, communicated to the surrounding atmosphere; some plants, which have



no smell during the day, emit an odor in the evening; and the sweet smell of new hay, is perceptible only when the grass begins to dry.

Q. How is the green color of plants accounted for?

A. The green color of vegetables is supposed to arise from the oil, which they contain, acted upon by the rays of the sun, as it is well known, that plants raised in the dark, are of a pale, sickly white.

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## CHAPTER VI.

### *The Flower and Fruit.*

Q. WHAT is the flower?

A. The flower is that temporary, and often beautiful part of a plant, which is destined for the formation and perfection of the fruit and seeds.

Q. What are its principal parts?

A. The parts of a flower, called the parts of fructification, are seven; namely, the *calyx*, the *corolla*, the *stamens*, the *pistils*, the *pericarpium*, the *seed*, and the *receptacle*.

Q. What is the calyx?

A. The calyx or flower-cup, is the green part situated immediately under the blossom; as, the green leaves of a rose-bud. *See plate.*

Q. What is the corolla?

A. The corolla are the delicate leaves called the blossom; as, the red and fragrant parts of a rose: one of these red leaves is called a *petal*.

Q. In what part of the flower is the honey found?

A. The honey, which is extracted by bees and other insects, is an almost universal fluid in flowers, found at the bottom of the corolla, in the part called the *nectary*, which however is not always distinct and perceptible.

Q. What are the stamens?

A. The stamens are the threads within a flower, which have heads called *anthers*: the slender part by which they are fastened to the flower, is termed the *filament*.

Q. What are the pistils?

A. The pistils are the threads situated within the stamens, in the centre of the flower; each of which consists of three parts.

Q. Describe the parts of the pistil?

A. The thickest part at the bottom of the pistil, is called the *germen*, or seed bud, and contains the rudiments of the young fruit or seed; the *style* stands upon the germen, and serves to elevate the *stigma*, or highest part of the pistil.

Q. What is the pericarpium?

A. The pericarpium, or seed-vessel, is the germen grown to maturity: it varies extremely, being pulpy in apples and pears; fleshy in

plums and cherries; hard in nuts; or juicy, as in the gooseberry and currant.

Q. Is then, the fruit which we eat, the pericarpium?

A. Yes, the fruits which afford us so many luxuries for the table, are in reality nothing more than pericarps, serving to protect the seeds till ripe, and then, by becoming the food of animals, or by other means, to promote their dispersion.

Q. What is the seed?

A. The seed is that part of every plant by which it is propagated: the part of the seed which contains the future plant, is the germ, vulgarly called the eye; no seed being capable of vegetating, if this be defective.

Q. How is the seed generated?

A. The head of the stamen is provided with a fine dust called pollen, which falling on the gummy matter at the top of the pistil, is there absorbed and carried down into the germen or seed-vessel, where the seed is in consequence rendered fruitful and capable of re-producing the plant.

Q. What wonderful means are employed to scatter and preserve the seeds?

A. Many fruits are swallowed by quadrupeds or birds, and the seeds carried unhurt to distant parts: some are furnished with downy wings, as the dandelion and thistle; and all are scattered about by the winds, and preserved

by their hard coverings till excited into germination by the heat of the ensuing spring.

Q. What is the receptacle?

A. The receptacle is the common base, which supports and connects the other parts of the flower : in many plants it is not very conspicuous ; but in the artichoke it is large and remarkable, and may be observed of a conical form in the common daisy.

Q. Why is a knowledge of the parts of fructification, most necessary to a young botanist?

A. The parts of fructification should be carefully studied and properly understood by the young botanist, as on them is founded the system of classification invented by Linnæus, and now almost universally adopted.

Q. Who was Linnæus?

A. Linnæus was a celebrated botanist, styled the *Prince of Naturalists* : he was a native of Sweden, and was born in the year 1707. He wrote many works on botany, and established that system which is called after his name.

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## CHAPTER VII.

### *The Classification of Plants.*

Q. DESCRIBE the Linnæan system?

A. Linnæus disposed the whole vegetable

creation into 24 divisions called *classes*, each of which he subdivided into *orders*.

Q. Upon what principle is this arrangement founded?

A. The Linnæan classification is founded upon the number, situation, and proportion of the stamens.

Q. How are the first ten classes known?

A. All plants with only one stamen, are of the *first* class; those with two, are of the *second*; those with three, are of the *third*; and so on, to the *tenth*; the number of stamens distinguishing the number of the class.

Q. How may the *eleventh* class be known?

A. In the eleventh class, each flower contains from 12 to 19 stamens: as, in the house-leek and mignonette.

Q. What distinguishes the *twelfth* class?

A. In the twelfth class there are 20 or more stamens in each flower, *inserted in the calyx* or flower-cup: as, the cherry, hawthorn, strawberry, &c.

Q. What plants belong to the *thirteenth* class?

A. The plants of the thirteenth class have upwards of 20 stamens like those of the twelfth, but differ very materially in having them *inserted into the receptacle* or base of the flower: as the poppy, anemone, butter-cup, &c.

Q. How is the *fourteenth* class distinguished?

A. The fourteenth class is known by having

two long stamens and two short ones in each flower ; as, the dead-nettle, snap-dragon, &c.

Q. What plants are comprehended in the *fifteenth* ?

A. In the *fifteenth* class, the flowers have each six stamens, four long and two short : as, the wall-flower, stock, radish, &c.

Q. How may the *sixteenth* class be known ?

A. The character of the *sixteenth* class is, that the stamens are all united together by thin filaments, forming a little tube round the pistil ; as, in the passion-flower, geraniums, &c.

Q. What distinguishes the *seventeenth* class ?

A. In the flowers of the *seventeenth* class, the stamens are united by thin filaments into two parcels or sets, which sometimes cohere together at the base : as, in the pea, kidney-bean, &c.

Q. Describe the plants of the *eighteenth* class.

A. The *eighteenth* class contains those plants in which the stamens are united into more than two *parcels* : as, in the citron and orange trees.

Q. How is the *nineteenth* class distinguished ?

A. In the *nineteenth* class the stamens are united by their anthers into a tube, but the filaments are separate : as, in the sun-flower, daisy, dandelion, &c.

Q. By what is the *twentieth* class known ?

A. The *twentieth* class may be known by



the stamens growing out of the pistil itself: as, in the common ladies-slipper and orchis.

Q. What plants belong to the *twenty-first* class?

A. The *twenty-first* class includes the plants in which the stamens and pistils grow on separate flowers, but on the same plant: as, the oak, hazel, and fir.

Q. What distinguishes the plants of the *twenty-second* class?

A. In the *twenty-second* class, the stamens and pistils grow not only on separate flowers, but on separate plants: as, in the hop, willow, yew, &c.

Q. How is the *twenty-third* class known?

A. The *twenty-third* class consists of those plants whose flowers are of three kinds; some having pistils only, some stamens only, and others with stamens and pistils in the same flower: as, the ash, maple, &c.

Q. What plants does the *twenty-fourth* class comprehend?

A. To the *twenty-fourth* class belong all plants in which the flowers are unknown, or not visible to the naked eye; as, ferns, mosses, mushrooms, sea-weeds, &c.

Q. How are the names of the classes formed?

A. The names of the classes are formed from Greek words, which express the character of each class. Those of the first thir-

teen classes, are formed from the Greek numerals, *mon*, *di*, *tri*, &c., and the word, *andria*, which signifies stamens.

NOTE.—The following list of the classes and their distinctions, may be divided into lessons, according to the capacity of the juvenile student.

*Table of the 24 Classes.*

1. Monandria.....One stamen.
2. Diandria.....Two stamens.
3. Triandria.....Three stamens.
4. Tetrandria.....Four stamens.
5. Pentandria.....Five stamens.
6. Hexandria.....Six stamens.
7. Heptandria.....Seven stamens.
8. Octandria.....Eight stamens.
9. Enneandria.....Nine stamens.
10. Decandria.....Ten stamens.
11. Dodecandria.....Twelve stamens.
12. Isocandria.....Twenty stamens.
13. Polyandria.....Many stamens.
14. Didynamia.....Four stamens, two long and two short.
15. Tetradynamia... Six stamens; four long and two short.
16. Monadelphia... { Filaments united at bottom but separate at top.
17. Diadelphia.....Filaments in two sets.
18. Polyadelphia... Filaments in many sets.
19. Syngenesia.....Stamens united by anthers.
20. Gynandria.....Stamens and pistils together.
21. Monœcia..... { Stamens and pistils in separate flowers, upon the same plant.
22. Diœcia..... { Stamens and pistils in separate flowers, upon different plants.
23. Polygamia.....Variously situated.
24. Cryptogamia....Flowers invisible.



## CHAPTER VIII.

*Orders, Genera, Species.*

Q. How are the classes subdivided?

A. Each class is divided into *orders*; distinctions in each order produce a further division into *genera*; and genera are again subdivided into *species*.

Q. On what are the *orders* founded?

A. The orders of the first thirteen classes, are founded solely on the number of *pistils* in each flower.

Q. How may the names be recollected?

A. The names of the orders, like those of the classes, are formed from the Greek numerals, by the addition of the word *gynia* instead of *andria*; so that when there is but one pistil, the plant is said to be in the order *monogynia*. If there be two, *digynia*; if three, *trigynia*, &c.; the word *gynia*, signifying a pistil.

Q. Name the orders of the first thirteen classes?

|                   |                 |
|-------------------|-----------------|
| A. Monogynia..... | One pistil.     |
| Digynia.....      | Two pistils.    |
| Trigynia .....    | Three pistils.  |
| Tetragynia.....   | Four pistils.   |
| Pentagynia.....   | Five pistils.   |
| Hexagynia.....    | Six pistils.    |
| Heptagynia.. ..   | Seven pistils.  |
| Octagynia.....    | Eight pistils.  |
| Enneagynia.....   | Nine pistils.   |
| Decagynia.....    | Ten pistils.    |
| Dodecagynia.....  | Twelve pistils. |
| Polygynia.....    | Many pistils.   |

Q. How many orders are there in the *fourteenth* class *didynamia*?

A. The fourteenth class has only two orders; *gymnospermia*, in which the seeds are naked at the bottom of the calyx, as lavender, mint, &c.; and *angiospermia*, where they are enclosed in a seed-vessel.

Q. How are the orders of the *fifteenth* class distinguished?

A. The two orders of the fifteenth class are distinguished by the form of the fruit: the first called *siliculosa*, has broad short pods; and the second, named *siliquosa*, is known by its long pods.

Q. How are the orders of the three following classes known?

A. The orders of the sixteenth, seventeenth, and eighteenth classes, are characterized by the number of *stamens* in each flower.

Q. What do you remark of the other classes?

A. The nineteenth class has five orders, which being rather difficult to understand, will more properly admit of being explained, when the plants of that class will be examined; the same may be observed of the rest.

Q. What is a *genus*?

A. Genus is a subdivision of an order, and includes such plants as agree with each other in the form and situation of their flowers and fruits.

Q. What is a *species*?

A. A species consists of a number of plants which agree in these particulars, but differ in the form of their root, stem, leaves, &c.

Q. Exemplify this division of classes, orders, genera, and species?

A. The geranium, which has ten stamens united in one set, is in the *monadelphia class*, and in *decandria order*; the whole family of the plant, constitute a *genus* of the order; and the different kinds, such as ivy-leaved, rose-scented, &c. are the different *species* of the genus.

Q. To what may this division be compared?

A. A class has been aptly described as bearing some resemblance to an army; an order to a regiment; a genus to a company; and a species to a soldier.

Q. What means do botanists employ to distinguish the species of plants?

A. In distinguishing the plant, two words are employed; the first which is called the *generic* name, is common to all the species of the same genus; and the second, termed the *specific* name, is confined to single species.

Q. Give an example?

A. In *rosa damascena*, which is the botanic name for the damask rose, *rosa* is the generic name applicable to the whole genus or family of roses; and *damascena* is the specific name, used to distinguish the particular kind or species of rose.

NOTE.—The description of the characters of plants upon paper, will appear dry, difficult, and uninteresting,

## CHAPTER IX.

CLASS I. *Monandria*.

Q. WHAT description of plants are comprehended in the first class?

A. The class of *Monandria* consists of such plants as have only one stamen in each flower.

Q. Mention the most remarkable.

A. The plants of this class are very few, and chiefly found in tropical countries; but we have the *hippuris-vulgaris* or common mare's tail, and the jointed glass-wort or marsh-samphire, the former of which will serve to exemplify the class.

Q. Describe the *hippuris-vulgaris*.

A. The *hippuris-vulgaris* grows in the muddy ponds and ditches of most parts of Great Britain, and blossoms in the month of June; the stem is straight, with the leaves

unless the pupil study them with the plant before him, which will at once convert a barren subject into a pleasing amusement. In dissecting the flowers, a needle, a sharp pointed penknife, and a microscope, will be found very useful, as many flowers are too delicate to be divided by the fingers, and the parts of others are too minute to be seen distinctly without the help of a magnifying glass. When the character in the flower do not correspond with the description, it is to be presumed that some of the stamens have fallen off, or that the flower is otherwise imperfect. Several should, in that case, be examined, or a bud that is not yet expanded may be carefully opened.

growing out of the joints, and the flowers at the base of each leaf.

Q. What is the form of the flower?

A. The flower, which is very small, has no blossom; its single stamen and pistil growing upon the receptacle, as may be seen in the first figure of the annexed plate.

Q. What is the jointed glass-wort?

A. The jointed glass-wort, or marsh samphire, is a very useful plant, found in marshes near the sea: when dried and burnt, its ashes are called kelp, and are used in the manufacture of glass and soap.

Q. What foreign plants belong to this class?

A. In monandria are found the beautiful exotic plants which produce ginger, turmeric, arrow-root, and cardamoms.

Q. Describe the ginger plant?

A. The ginger plant is a native of the East Indies, and rises in round stalks, about four feet high: it withers about the close of the year; and the roots, which are the only valuable part, are then dug up, scraped and dried with great care, and packed in bags for exportation.

NOTE.—Most of the peasantry in the Shetland Isles, and the Highlands of Scotland, are supported by collecting glass-wort and sea-weeds, and burning them into kelp, an article which produces considerable revenues to the proprietors of those districts. Many of the inhabitants of those dreary regions have nothing to depend upon for subsistence, but a miserable pittance which they acquire in this employment.



Q. What are the properties of arrow-root, turmeric, and cardamoms?

A. Arrow-root is a powder made from the root of an American plant, affording a wholesome and palatable food for children; turmeric is a root extensively used for dying yellow; and cardamoms are seeds valuable for their aromatic and medicinal qualities.

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## CHAPTER X.

### CLASS II. *Diandria*.

Q. WHAT description of plants are of the second class?

A. To the class of *Diandria* belong all the plants which have two stamens in each flower.

Q. What plants are of this class?

A. The privet, butterwork, meadow-sage, brook-lime, and others, are common in Great Britain; and the last of these may be chosen to illustrate the class.

Q. Describe the plant.

A. *Veronica*, or brook-lime, is very common in ditches and shallow streams: the stem is jointed and about a foot in height; the leaves are oval, of a pale green color, and growing out of the stem in pairs; the flowers, which

rise in bunches from the base of the leaves, are of a faint blue color, and divided into four small roundish leaves.

Q. How is it known to belong to the second class?

A. Brook-lime may be known to belong to the class diandria, by its having two stamens; and to the order monogynia, because there is but one pistil.

Q. Has this plant any medicinal qualities?

A. Brook-lime was formerly considered of much use in several diseases, and was applied externally to wounds and ulcers; it has a bitterish taste, and is considered very beneficial if the fresh plant be eaten as food.

Q. What useful plants belong to this class?

A. In the second class are found the different kinds of pepper-plants, which grow in the East and West Indies; and the olive tree, cultivated in the south of Europe for the sake of its fruit, from which olive oil is extracted by pressing it in a mill.

Q. Are there not some also that delight us with their fragrance?

A. The common lilac, that perfumes the air in summer evenings; the elegant and odoriferous jasmine; the rosemary and sage, cultivated in our gardens, but which grow spontaneously in warmer climates, are all in the second class, and display its characters.

## CHAPTER XI.

CLASS III. *Triandria*.

Q. How is the third class distinguished?

A. Plants of the third class are distinguished by having three stamens in each flower.

Q. What plant may be chosen as an example?

A. The *valeriana officinalis*, or great wild valerian, will serve to exemplify the class: it commonly grows about woods and hedges, flowers in June, and rises to the height of from two to four feet.

Q. Describe the plant.

A. The stalk of the valerian is smooth, upright and branching; the leaves on the stem are placed in pairs, upon short broad sheathes; the flowers are small, of a white or purplish color, and terminate the stem and branches in large bunches.

Q. What other plants are there of this class?

A. The different varieties of the spring crocus, one of the earliest ornaments of the flower garden, are well adapted to exemplify this class: one of the species, called saffron crocus, furnishes the drug called saffron.

Q. Are there no other plants of this class that are found in the fields?



A. To this class Triandria belong all the different species of grasses, which clothe the fields with verdure, supplying pasture for cattle and grain for man.

Q. Are there not many kinds of grass?

A. Botanists have enumerated upwards of 300 varieties, they may all be known by a straight hollow stalk, called the culm or straw, sheathed with long tapering leaves, growing out of the joints of the stalk.

Q. What are their parts of fructification?

A. The part of fructification in grasses, is in the ear or head, and consists of two green husks, forming the calyx, within which, is a small blossom of two valves, containing three delicate stamens, that hang over the calyz, and being agitated by every breath of air, give the ear when in bloom a very pretty appearance.

Q. What are the grasses used as food for man?

A. Wheat, barley, oats, rye, and different kinds of corn, are the seed of various grasses; and although at present so extensively cultivated, but few of them are natives of this country.

Q. What are their different uses?

A. Wheat and rye, when reduced to flour, are made into bread, which has been emphatically termed *the staff of life*: barley is chiefly converted into malt, for making beer; oats serve as food for horses, but in Scotland and

Ireland are often ground into meal, for porridge and bread.

Q. What other grasses are valuable to man?

A. The sugar cane or reed, grows to the height of ten feet, and is cultivated in the East and West Indies, for the sake of the juice, from which sugar is made; in the same parts grow also the beautiful tamarind tree, the fruit of which is so much esteemed as a delicacy, as well as for abating thirst and heat in various inflammatory complaints.

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## CHAPTER XII.

### CLASS IV. *Tetrandria.*

Q. How is a plant of the fourth class known?

A. All plants of which the flowers have four stamens of an equal length, belong to the fourth class.

Q. What examples are there of this class?

A. Among the most common are teasel, madder, pond-weed, and holly.

Q. Describe the holly tree?

A. The holly is a well known evergreen of

NOTE.—It is necessary to caution the pupil against confounding this with the fourteenth class, in which the number of stamens is the same, but of unequal length, two being short and two long.

singular beauty, with shining prickly leaves, and white flowers, which grow in clusters round the branches, and are succeeded by berries of a bright scarlet color containing four very hard seeds.

Q. What is an evergreen?

A. An evergreen is a plant, that retains its leaves green, during both the winter and summer.

Q. Is this plant applied to any useful purpose?

A. Birdlime is made from the inner bark of the holly, by beating it in a running stream, and leaving it to ferment in a close vessel: in severe winters, also, when other food is scarce, the upper boughs, which have smooth leaves, are cut down, and afford a grateful food to deer and sheep.

Q. What are the uses of the teasel and madder?

A. The heads of the teasel are armed with sharp slender bristles, which were at one time extensively used by clothiers, for raising the knap on cloth. Madder is a useful plant, common in the west of England, the root of which yields a beautiful scarlet dye.

## CHAPTER XIII.

CLASS V. *Pentandria*.

Q. WHAT plants belong to the fifth class ?

A. Plants whose flowers have five stamens, belong to the fifth class ; this is the most numerous of all the classes, as it comprehends more than one-tenth of the plants at present known.

Q. What plants may be examined in this class ?

A. The *atropa belladonna*, or deadly nightshade, will afford a specimen of the fifth class ; and a knowledge of its habits and conformation will be the more useful, as every part of the plant is highly poisonous, and when eaten, has often proved fatal in its effects.

Q. Describe the plant.

A. The deadly nightshade grows in woods, hedges, and shady waste grounds, and is from

NOTE.—Some young persons at Edinburgh, perceiving in a garden the beautiful berries of the deadly nightshade, and unacquainted with their poisonous quality, ate several. Scarcely half an hour had elapsed before violent symptoms appeared, followed by insanity, gnashing of the teeth, and convulsions. Their bodies swelled, the face became red and tumid, and in nine hours after two of them expired : notwithstanding every medical assistance that could be bestowed on them. It may be necessary to remark, that vinegar liberally drunk, has been found to counteract the effect of this dangerous poison.

three to five feet in height: the whole plant is covered with fine hair, and the leaves are of an oval shape, standing in pairs upon short foot-stalks.

Q. What is the shape and color of its flowers and fruit?

A. The flowers are bell-shaped, and of a dark purple color: they appear in June or July; but the berries are not ripe till September, when they too frequently tempt children to eat them, by their shining black color and sweet taste.

Q. Is there no other species of nightshade?

A. The garden nightshade, whose flowers are white, and the ripe berries black; and the woody nightshade, which grows in hedges, and bears red berries, are both poisonous, and belong equally to this class?

Q. What other plants belong to the fifth class?

A. Plants of this class are very numerous: among the most common and interesting, are the primrose, cowslip, violet, polyanthus, and honey-suckle; besides parsley, hemlock, fennel, and other umbelliferous plants.

Q. What are umbelliferous plants?

A. An umbelliferous plant is one which sends out from the upper part of the stem, as from a centre, a number of supports, which spreading like the spokes of an umbrella, crown the stem with a great number of small



flowers; and in the compound umbel, each spoke bears a little umbel at its end.

Q. Name some of the useful plants of this class.

A. The refreshing currant and gooseberry: the common flax, so elegant and useful; the creeping and ornamental ivy; and the elder-tree, the wood of which is used in manufacturing musical instruments, and the berries made into wine, form a useful and valuable beverage, are useful plants.

Q. What other remarkable plants belong to this class?

A. To the fifth class belong the potatoe, carried to Europe from this country, by Sir Walter Raleigh; the tomato, or love apple; the vine; the capsicum, or guinea pepper; the coffee tree; and the tobacco plant, about five or six feet in height, from the leaves of which, all the different kinds of tobacco and snuff are prepared.

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## CHAPTER XIV.

### CLASS VI. *Hexandria*.

Q. OF what plants does the sixth class consist?

A. To the class *Hexandria* belong all plants,

whose flowers contain six stamens ; as may be seen in the lily, and many other beautiful flowers of the same tribe.

Q. Describe the lily.

A. The *lilium candidum*, or common white lily, usually rises about three feet in height, with long narrow pointed leaves, irregularly scattered over the stem ; the flower has no calyx ; and the corolla is bell-shaped, consisting of six petals, within which are the stamens and one pistil, furnished with a long triangular stigma. *See plate.*

Q. When does this flower appear ?

A. The lily flowers appear in June and July ; and although not a native of this country, it now very commonly decorates the borders of our gardens, not unfrequently mixed with the splendid orange lily, belonging to the same class.

Q. What other flowers belong to this class ?

A. Hexandria includes a most beautiful and brilliant assemblage of flowers ; as the modest snowdrop, the delightful amaryllis, the fragrant lily of the valley, the gaudy tulip, the narcissus, the hyacinth, the golden crocus, and numerous exotics which either delight the eye with their various hues, or sweeten the air by their fragrance.

Q. What useful plants do you notice ?

A. The valuable rice plant, a grass with six stamens, cultivated throughout the East, as the



primary article of food, the same as wheat with us; the curious barberry, the acid berries of which, boiled with sugar, are used as a sweetmeat; the delicious pine apple; and the asparagus, sorrel and garlic, which serve for many culinary purposes, are of the class hexandria.

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## CHAPTER XV.

### CLASS VII. *Heptandria*.

Q. WHAT plants does the seventh class contain?

A. The seventh class, *Heptandria*, is composed of such plants as have in their flowers seven stamens; it contains fewer plants than are to be found in any other class.

Q. What example will you then give of this class?

A. The horse chestnut, or *æsculus hippocastanum*, one of the most superb ornaments of our parks and pleasure grounds, will serve as a specimen: it is a native of the north of Asia; and in the month of May, bears clusters of flowers, in the form of pyramids, which make a beautiful appearance.

Q. Give a botanical description of its flowers?

A. The calyx is tubular, and divided at the brim into five short segments ; the corolla consists of five petals, inserted into the calyx by narrow claws, and is of a fine white color, irregularly spotted with red and yellow.

Q. How is it known to belong to the seventh class ?

A. The horse-chesnut is known to belong to this class, from its having seven stamens ; the filaments of which are tapering, about the length of the corolla, and supplied with pointed anthers ; its single pistil indicates it to be in the order monogynia. *See plate.*

Q. To what uses is this tree applied ?

A. The fruit, which is contained in prickly husks, is the favorite food of deer, and is also eaten by horses, sheep, and oxen ; when ground, starch has been made of the flour ; and it is used on the continent, for the purpose of cleaning woollens and bleaching linens ; the bark is also sometimes used in medicine.

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## CHAPTER XVI.

### CLASS VIII. *Octandria.*

Q. WHAT plants constitute the eighth class ?

A. The class Octandria is distinguished by its flowers bearing eight stamens.

Q. What plant will you select to exemplify the class?

A. *Chlora perfoliata*, yellow-wort, or centaury, is in this class, and is found growing in the sandy soils of some parts of Norfolk, and other parts of the country; it flowers in July, and grows about a foot high.

Q. What other plants does it contain?

A. To the eighth class belong the balm of Gilead tree, so valuable in medicine, which grows in several parts of Africa and Asia: the rosewood tree, useful for ornamental purposes; the rich colored and well-known nasturtium; the numerous and beautiful genus of heaths; the cranberry and whortleberry shrubs, the fruit of which is much esteemed by confectioners for tarts; and the beautiful mezereon shrub, one of the earliest productions of Flora, often exhibiting its brilliant scarlet flowers in January and February.

Q. Is not the maple tree also in this class?

A. The maple and sycamore trees have, by some naturalists, been removed into this class from the twenty-third. The sugar maple is very useful to the inhabitants of this country, who make large quantities of sugar from the juice or sap, which flows, on piercing the trunk of the tree in spring.

## CHAPTER XVII.

CLASS IX. *Enneandria*.

Q. How is the ninth class known?

A. The ninth class consists of plants whose flowers have nine stamens; the beautiful flowering rush, which grows on the margins of pools and slow running streams, is a specimen.

Q. Describe the plant?

A. The *butomus umbellatus*, or flowering rush, rises from the water with a round smooth stalk, from two to five feet high: at the top is a head of rose-colored flowers; each of which is composed of six petals, hollowed out like a bowl, and three of them smaller than the rest.

Q. In what order is it?

A. The flowering rush is in the order hexagynia, from its having six pistils: they are united together at the bottom, and consists of a germen gradually passing into a style. *See plate.*

Q. What plants belong to the ninth class?

A. The other principal specimens are the

NOTE.—The stately appearance and beautiful flowers of this rush in the summer months, are inferior to scarcely any other aquatic plants: no piece of water should therefore be destitute of so elegant an ornament. It is of easy culture; for the plant taken from its place of growth, and sunk into the water with a stone to keep it fixed, is sure of succeeding.

cinnamon, sassafras, camphor, and cassia ; besides the bay tree, the true laurel with which the ancients crowned their victorious generals.

Q. How is cinnamon procured ?

A. Cinnamon is the inner bark of a small laurel tree growing in the East Indies : the bark, while on the trees, is first freed from its external greenish coat ; it is then cut lengthwise, stripped from the trees, and dried in sand, where it becomes of a reddish yellow color, and curls up into quills or canes.

Q. What is camphor ?

A. Camphor is a valuable drug, produced by a tree of large growth in Japan : it is obtained by picking it out in small pieces from the crevices and knots of the tree, which is cut down and slit into pieces for that purpose.

Q. Describe the plant which produces the rhubarb.

A. The rhubarb plant is a native of Turkey in Asia, where it rises to the height of six or eight feet, and is frequently planted in our gardens ; the part useful in medicine, is the root, which is chiefly brought from Turkey, in roundish pieces of a lively yellow color, variegated with streaks of bright red : the stalks make pleasant tarts.

## CHAPTER XVIII.

CLASS X. *Decandria.*

Q. WHAT plants are comprehended in the class Decandria?

A. The tenth class comprises all the plants whose flowers have ten stamens.

Q. Mention some of the plants?

A. In this class is included a great assemblage of fine plants and flowers: as the beautiful pink or carnation tribe; the numerous saxifrages, one species of which bears the name of London-pride; and the arbutus or strawberry tree, which grows wild in Ireland, and is remarkable for bearing flowers in December, and ripening its fruit in the ensuing winter.

Q. What plant may be selected to exemplify the tenth class?

A. *Dianthus cœsius*, mountain or chudder pink, so called from its growth amongst the chudder rocks, where it presents a very cheerful appearance, by its lively red flowers, about four inches high, from May till August.

Q. What other plants will serve as specimens?

A. We may examine the garden-rue; the corn-cockle, found in corn-fields in June and July; the common chick-weed; the stone crops, yellow succulent plants growing on



walls and roofs; and the silene or catchfly, which takes its name from the entrapping flies with its clammy exudations.

Q. Are there no trees in this class?

A. Among the trees of this class are the arbutus, and those that produce the mahogany, lignum-vitæ, log-wood, and Brasil wood.

Q. Describe the mahogany tree?

A. The mahogany tree grows to a large size in the warmest parts of America, and is very profitable to the British settlers; the wood is preferred to any other for ornamental purposes, as it takes a fine polish, is beautifully variegated, and very durable.

Q. What is lignum-vitæ?

A. Lignum-vitæ is the wood of a large tree, growing in the West Indies: it is so heavy as to sink in water; and, from its hardness and beauty, is in great demand for various articles of turnery ware.

Q. Whence is log-wood chiefly imported?

A. The log-wood tree is smaller than the lignum-vitæ, and grows to the highest perfection at Campeachy, in the bay of Honduras, north Guatemala; the wood, which is of a dark red color, is of the greatest use in dying cloth and staining wood, and is brought to Europe in junks or logs of about a yard in length, which are cut in pieces, and bruised in a mill, before being used by the dyer.

Q. For what is Brasil wood used?

A. Brasil wood comes from the West Indies, and is chiefly used for giving a beautiful scarlet color to cloth; but from its taking a high polish, and its lively color, it is often wrought into various elegant articles of turnery.

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## CHAPTER XIX.

### CLASS XI. *Dodecandria.*

Q. WHAT kind of plants belong to the eleventh class?

A. The eleventh class consists of plants having flowers with from twelve to nineteen stamens in each.

Q. What well known plants belong to this class?

A. In the class *Dodecandria* are found, the purple loose stripe, common on the banks of rivers; the common agrimony; weld, or dyer's weed; the delightful mignonette, originally brought from Egypt; and the common house-leek, which will serve as an example of the class.

Q. Where is the house-leek found?

A. The *supervivum tectorum*, or common house-leek, is a small evergreen that grows in clusters on the roofs of cottages and the tops of old walls: the leaves adhere to the plant

in thick tufts, are of a fleshy substance and fringed at the edges with hair.

Q. Give a botanical description of its flowers?

A. The calyx is divided into 12 parts; the corolla is longer than the calyx, and consists of 12 or more petals; and the number of stamens is the same as that of the petals.

Q. In what order is it?

A. The house-leek is known to be in the order dodecagynia, from its having about 12 pistils, which are placed in a circle within the stamens; the germens gradually decline into sharp summits, and the flower is succeeded by twelve capsules.

Q. To what use is weld applied?

A. Weld, or dyer's weed, is made great use of for dying woollen, silk, or cotton, of a beautiful yellow color; its flowers have been observed to follow the course of the sun, turning towards the east at sun-rise, and towards the west at its setting, and at midnight pointing to the north.

NOTE.—The examination of plants of this class, is often unsatisfactory to the novice, as the stamens vary from 12 to 19, and are sometimes even fewer than 12, coming out at different periods. In the house-leek this uncertainty occurs in all the parts of the flower, particularly in the number of pistils, which differs according to the richness of the soil in which the plant is found.

## CHAPTER XX.

CLASS XII. *Icosandria*.

Q. How is the class *Icosandria* known?

A. The twelfth class, *Icosandria*, has 20 stamens and upwards, inserted into the calyx.

Q. What plants does it comprehend?

A. This class contains the most esteemed fruit-trees, such as the apple, pear, plum, medlar, cherry, and their different varieties; besides a pleasing assemblage of shrubs and herbs, as the strawberry, the raspberry, the rose, the sweet-briar, the bramble, &c.

Q. Do all these grow wild in England?

A. They are all found wild in England; and it is remarkable, that the wild apple, or crab-tree, is the original from which all the garden varieties are derived; as the bullace or wild plum, is the parent stock of the exquisite magnum bonum, green-gage, and other plums.

Q. What plant will you examine in this class?

NOTE.—It may be proper, in this place, to caution the pupil against consulting flowers that are double, like those of the garden-rose; as in becoming double they commonly lose their distinctive character, and are therefore useless to the botanist. Great richness of soil and high cultivation, have this effect upon single flowers; and the stamens, in some kinds, are converted into petals, so that they no longer produce seed. By transplanting the plant into a poorer soil, it is usually brought back to its natural state.

A. The *rosa canina*, or dog-rose, which frequently makes a conspicuous and beautiful appearance in woods and hedges, in the month of June, will serve as a specimen of the class.

Q. Describe the flower?

A. The wild rose has a corolla of five heart-shaped petals, each fixed by a sort of claw to the neck of the calyx: the stamens are numerous, and attached to the sides of the calyx.

Q. What is remarkable of the calyx?

A. The calyx is composed of one leaf, with five long and narrow divisions, two of which have teeth on both edges, another is toothed on one edge only, and the other two are entire; when the blossom falls off, the calyx contracts at the neck, so as to form a red berry, containing numerous seeds.

Q. What are some other plants of the twelfth class?

A. Among the plants of this class, are the almond and peach trees, the clove tree, the laurel, and the myrtle.

Q. Describe the almond-tree?

A. The almond-tree is a native of Barbary, usually varies from 12 to 16 feet in height, and has long pointed leaves of a bright green color; the fruit consists of a tough hairy substance, within which is the thick rough shell that contains the kernel.

Q. Where does the clove tree grow?

A. The tree which produces this well-known spice, is a native of the East-Indies, and in its general appearance resembles the laurel : the part used is the unexpanded flowers and calices, which acquire their dark brown color from the smoke by which they are dried, in order to preserve their aromatic qualities.

Q. What do you remark of the laurel and myrtle ?

A. The common laurel is an evergreen, and was originally introduced from the Levant : that elegant little shrub, the myrtle, grows wild in Asia and Africa ; and one species of it in the West Indies, rises to the height of above thirty feet, and produces the berries called pimento, or all-spice.

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## CHAPTER XXI.

### CLASS XIII. *Polyandria.*

Q. WHAT characterizes the thirteenth class, Polyandria ?

A. In the thirteenth class the stamens are numerous, from 20 to 1000 rising immediately from the receptacle.

Q. How is this class further distinguished from the last, in which the stamens were fixed in the calyx ?



A. In the class Icosandria, the calyx is always of one piece, divided at its border, and usually permanent ; whereas in this class, Polyandria, if the flower have a calyx at all, it consists of two or more leaves, which generally fall off as soon as the blossom opens.

Q. What plant will you select for examination ?

A. The common red poppy, (*papaver rhæas*,) which is found in corn fields, and flowers in June and July, will afford a good example.

Q. Describe the flower ?

A. The calyx consists of two oval leaves, which falls off as the flower expands ; the corolla is composed of four roundish petals, of a bright scarlet color, and marked at the base with a shining black spot ; the germen is shaped like an urn ; there is no style ; and the summit is convex, and divided into rays like the spokes of a wheel.

Q. Is not opium obtained from a species of the poppy ?

NOTE.—From the resemblance in the structure between the plants of this and those of the preceding class, some late writers on Botany have injudiciously united them into one. It is, however, very important to preserve them distinct, as the character of the class Icosandria, indicates the pulpy fruits which accompany it to be infallibly wholesome ; whereas some of the other class are absolutely poisonous. Sir J. E. Smith has observed, that no traveller in the most unknown wilderness need be afraid to eat the fruit of any plant whose stamens grow upon the calyx.

A. The large white poppy, from which opium is procured, is a native of England, usually growing in neglected gardens; but in the eastern countries it is regularly cultivated, and is a source of considerable profit to the inhabitants.

Q. How is opium produced?

A. When the seed vessels of the poppy are half grown, several incisions are made in them, with a sharp instrument, and the milky fluid which exudes, is scraped off, and when sufficiently dried in the sun, is formed into cakes or rolls for sale.

Q. To what uses is it applied?

A. Opium is of great use in medicine, particularly in causing sleep and allaying pain: the Turks and other eastern nations, use it to produce intoxication, and chew it in the same manner as others chew tobacco.

Q. What other plants belong to this class?

A. The class Polyandria is also exemplified in the water-lily, whose foliage and beautiful flowers make a fine appearance on the surface of ponds; the lime-tree, the pæony, crowfoot, marsh-mary-gold, monkshood, hellebore, and those brilliant ornaments of the parterre, the ranunculus and the anemone.

Q. What remarkable foreign plants are there?

A. To this class belong the caper-shrub, the precious nutmeg, and the tea-tree, which

affords the agreeable beverage now almost universally used in every country.

Q. Of what country is the caper-bush a native?

A. The pickle in common use, under the name of capers, is the young flower buds of a beautiful shrub found in the Levant and the south of France, where it grows wild among rocks and rubbish, and is as common as the bramble is with us.

Q. What kind of tree produces the nutmeg?

A. The nutmeg tree is a native of the East Indies, and attains to the height of 30 feet, producing numerous branches, the fruit of which is round, or oval like the peach, and contains, under a fleshy covering, the seeds or kernels, called nutmegs.

Q. Describe the tea-tree.

A. The tea-tree, which is cultivated as an important article of commerce in China and Japan, is an evergreen, attaining to the height of from six to ten feet, much branched, and covered with a rough dark grey bark: the flowers are white, somewhat resembling those of the dog-rose; and the leaves, which are the only valuable part, are narrow and tapering, and about an inch and a half in length.

Q. In what manner are the leaves prepared?

A. When the tree is three years old, the leaves are carefully gathered, and put into a large iron pan over a furnace, where they are

dried to a certain degree ; they are then spread upon mats, and rolled by workmen between the palms of their hands, after which they are cooled as speedily as possible ; and the process is repeated several times with the same leaves, before they become fit for use.

## CHAPTER XXII.

### CLASS XIV. *Didynamia*.

Q. WHAT are the characters of the class *Didynamia* ?

A. The plants of the fourteenth class are distinguished by the proportion of the stamens, which are four in each flower, two long and two short.

Q. How are they further distinguished ?

A. In the present class, the flowers are of a particular structure, the corolla being of that form which is called ringust, or gaping, from its resemblance to an open mouth.

Q. Give an example.

NOTE.—Tea was first introduced into Europe from China, by the Dutch merchants, in 1641, and into England about the year 1666, when it sold for 60 shillings per pound. In China and Japan, it is drunk as commonly as beer is in England, and is sold in the same manner in every town, and on every road. It is there, however, used without sugar or cream.

A. The common white dead nettle, *lamium album*, which is found growing in every hedge, is in this class, and will serve as a specimen.

Q. Describe the construction of the flower?

A. The flowers are inserted round the stem in whirls or sets; each corolla is of one piece, of a tubular shape, and divided at the top into two lips, the upper of which is called the helmet, and the lower the beard.

Q. Where are the stamens situated?

A. By lifting up the helmet, four stamens are discovered in two pairs, and of a dark color: and in the midst of them is a forked style, which remains fixed to the receptacle, when the stamens are pulled off with the corolla.

Q. Are there no other plants?

A. Plants of this class are of common occurrence, both in fields and gardens; as the ground ivy, mint, common marjoram, thyme, eye-bright, snap-dragon, yellow-rattle, and the showy and medicinal fox-glove; besides lavender, and many others introduced from foreign countries.

NOTE.—In the first 13 classes the orders have been distinguished solely by the number of styles in each flower; but in the remaining classes, the orders are formed by other circumstances, which it is necessary to point out.

The fourteenth class has two orders, distinguished by the nature of the seed:

1. *Gymnospermia* has four naked seeds at the bottom of the calyx; as may be seen in the dead nettle and scullcap.

2. *Angiospermia*, having numerous seeds covered with a pericarp; as in snap-dragon and yellow rattle.



Q. Do no trees belong to this class?

A. There are a few; the most remarkable of which is the calabash tree of the West-Indies, which produces fruit so large that the shell is capable of holding two pints of water, and being hard, is converted into bowls, dishes, spoons, &c.

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## CHAPTER XXIII.

### CLASS XV. *Tetradynamia*.

Q. WHAT plants belong to the class Tetradynamia?

A. The plants of the fifteenth class, have flowers with six stamens, four of which are longer than the other two.

Q. What native plants of this class may be commonly met with?

A. Examples of Tetradynamia are found in the shepherd's purse, honesty, candy-tuft, and scurvy-grass, which grow wild in the fields; in the cultivated turnip, cabbage, radish, and

NOTE.—To assist the student in distinguishing this class from the sixth, in which the stamens are of equal length, he may remember that the flowers of the fifteenth class have always four petals, which form a cross, being regularly placed in pairs opposite to each other, and are thence called cruciform, or cross-shaped.



mustard ; and the sweet-scented wall-flower and stock.

Q. Give a botanical description of the wall-flower ?

A. The wall-flower has a calyx of four spear-shaped leaves, and a corolla of four petals of a roundish form, fastened to the receptacle by a claw as long as the calyx : the divided summit of the pistil, and four of the stamens, are visible in the unopened flower, but the two shorter ones remain concealed within the calyx.

Q. Of what shape is the seed vessel ?

A. When the corolla falls off, the germ of the wall-flower grows into a long silique or pod, containing several flat egg-shaped seeds ; and when nearly ripe, it opens at the bottom in two valves, and discloses the seeds ranged on both sides of the membrane which separates the valves.

Q. Have all cruciform flowers the same kind of seed vessels ?

A. In some plants of tribe, the seed vessel is a roundish pouch or pod, as may be seen in the horse-radish, shepherd's purse, and the oval silky pouches of honesty.

NOTE.—This difference in the shape of the seed-vessel, forms the two orders into which the class is divided.

1. *Silliculosa*, has the seeds in a pouch more broad than long ; as shepherd's purse and honesty.

2. *Siliquosa*, in which the seeds are contained in a long pod ; such as the wall-flower, stock, turnip, and radish.

Q. What is mustard ?

A. Mustard (*sinapis nigra*) is a plant known by its bright yellow flower, that grows wild in corn-fields, but is cultivated to great advantage for the sake of the seeds, which, when powdered, produce the mustard which is in common use at our tables.

Q. For what is woad used ?

A. Woad is extensively used in dying woolen cloth of a fine blue color : it is said to be the plant with which the ancient Britons painted their bodies, to give them a bluish appearance, and a more dreadful aspect in battle.

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## CHAPTER XXIV.

### CLASS XVI. *Monadelphica*.

Q. How are plants of the class *Monadelphica* distinguished ?

A. In the sixteenth class, the stamens are combined by their filaments into one tube, or common base.

Q. What familiar plants will serve to exemplify it ?

A. The characters of this class, may be observed in the common mallow, the holly-

hock, the large and beautiful family of geraniums, the passion-flower, and the hibiscus.

Q. What useful exotics does it comprehend?

A. The most valuable is the cotton plant, which is cultivated in the East and West Indies, and in Southern States of our own country: the seed vessels contain a white downy substance, which, after undergoing the process of carding and spinning, is woven into the cloth called cotton.

Q. Is not nankin also a species of cotton?

A. Nankin is manufactured from a cotton of a reddish yellow color, which is produced in China, in the province of which Nankin was the capital: it is of considerable value, on account of its durability, and never losing its color, even with long use and frequent washing.

Q. Will it not be proper to examine a plant in this class?

A. The common mallow will be very fit for that purpose, as it affords a good example of the construction of the whole class.

Q. Where is it found?

A. The mallow is common under hedges, and in waste ground, and flowers from June to September: there are also two other species, the tree-mallow and the marsh-mallow, neither of them materially differing in their characters.

Q. Describe the common mallow?

A. *Malva sylvestris*, or common mallow, rises from one to three feet in height, has a

rough, upright and branched stem, and hairy leaves, with five or seven divisions, unequally notched at the edges, and a purplish stain near the stalk.

Q. What are the characters of the flowers?

A. The flowers are large, consisting of five heart-shaped petals, of a purple color, painted with veins of a deeper hue; the calyx is double; and the middle of the receptacle rises like a little pillar, supporting numerous stamens, and many thread-like stigmas.

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## CHAPTER XXV.

### CLASS XVII. *Diadelphia*.

Q. OF what plants does the seventeenth class consist?

A. The seventeenth class, *Diadelphia*, contains the plants whose stamens are united by

NOTE.—The sixteenth class has eight orders, which are distinguished by the number of stamens.

1. *Triandria*, three stamens.
2. *Pentandria*, five stamens, contains the stock's bill.
3. *Endecandria*, seven stamens.
4. *Octandria*, eight stamens.
5. *Decandria*, ten stamens, contains the geraniums.
6. *Endecandria*, eleven stamens.
7. *Dodecandria*, twelve stamens.
8. *Polyandria*, many stamens, contains the mallow described above, and the holly-hock.

their filaments into two parcels or sets, for the most part in unequal numbers.

Q. How are the plants of this class further distinguished?

A. The flowers of the plants of this class, from the pea to the smallest species of trefoil, are all of the same form, called capilionaceous, or butterfly-shaped, from a fancied relation to the form of a butterfly.

Q. What examples can you give of the class?

A. Among the plants of this class, are fumitory, common in corn-fields; milk-wort, a pretty little plant with blue flowers, found on heaths; peas, beans, vetches, broomfurze, and clover.

Q. What papilionaceous flowers will you select as a specimen?

A. The fragrant sweet pea, or the garden pea, some of whose flowers may be procured during the greater part of the year, will serve to illustrate the class.

Q. How is the flower formed?

A. The flower consists of five petals, the largest of which, that turns upwards, is called the standard; the two side pieces resembling each other, are the wings, below which is seen a greenish white part, called on account of its form, the keel or boat.

Q. Where are the stamens and pistils?



A. On pulling the keel gently downwards is seen the germ, or element of the pea-pod, surrounded by a cylindrical membrane, which terminates in ten distinct stamens, forming as it were an exterior armor about the germ, to defend it from rain and other injuries.

Q. Where do you observe the character of the class Diadelphia?

A. By examining the membrane more closely, two small holes will be discovered near the base, and on inserting a needle through both, one stamen will separate from the rest, and thus will form two sets, displaying the character of the class.

Q. How is the seed-vessel constructed?

A. The pod or legume of the papilionaceous tribe, is not divided by a partition, like the pod or silique of the wall-flower, but the seeds are fastened alternately to each valve, and all of them to the thick edge of the legume.

Q. What remarkable exotics does this class contain?

NOTE.—The class diadelphia, is divided into four orders, named from the number of the stamens.

1. *Pentandria*, five stamens.

2. *Hexandria*, six stamens, in which the filaments are separated into two bodies, each having three anthers as in fumitory.

3. *Octandria*, eight stamens, contains only the genus polygala, or milk-wort.

4. *Decandria*, ten stamens, contains the plants which are usually termed leguminous, such as peas, beans, vetches, broom, furze, and trefoil.



A. Besides the acacia-tree, laburnum, and other ornaments of the shrubbery, the seventeenth class has the liquorice tree, and the plant growing in the East Indies, whose leaves afford the indigo for dying blue cloth.

Q. Describe the liquorice plant.

A. The liquorice plant is a native of the South of Europe, but is extensively cultivated at Pontefract, in Yorkshire, and in other parts of England: the plant rises four or five feet in height; and after three years growth, the roots are dug up for sale.

Q. What properties does this root possess?

A. Liquorice has a very rich sweet taste, and is almost the only sweet that quenches thirst; it is very useful in obstinate coughs, and an infusion or extract, conceals the taste of unpalatable drugs more effectually than syrups, or any sugared substance.

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## CHAPTER XXVI.

### CLASS XVIII. *Polyadelphia.*

Q. WHAT is the character of the eighteenth class?

A. In the flowers of the class Polyadelphia, the stamens are collected into more than two parcels or sets, each parcel united at the bottom by the filaments.

Q. What plants are there of this class?

A. The eighteenth class does not contain many plants. The *Hypericum androsæmum*, or tutsan, a species of St. John's wort, will serve as an example.

Q. In what situation does it grow?

A. Tutsan grows in woods and damp, uncultivated grounds, but is not very common; it bears flowers in July, of a rich yellow color, on a shrub-like stem, about a foot and a half in height.

Q. Describe the flower?

A. The calyx is placed below the germen, and consists of five acute leaves; the petals are also five in number, and of an irregular oval shape; the stamens are numerous, and commonly united at their bases into three portions or bundles; and the seed-vessel is a small pulpy berry, which, when ripe, is of a purplish black color.

Q. Mention some of the foreign plants.

A. Among the most interesting foreign

NOTE.—This class, as arranged by Sir J. E. Smith, has three orders, distinguished by the number or insertion of the stamens.

1. *Dodecandria*, having stamens 12 in number, and their filaments connected with the calyx, as in the orange and lemon.

2. *Icosandria*, having 20 stamens, their filaments inserted (in several parcels) into the calyx.

3. *Polyandria*, having many stamens unconnected with the calyx, as in tutsan, and the several kinds of St. John's wort.

plants, are the chocolate nut-tree, the orange, lemon, and citron trees.

Q. Of what part of the world are the orange and lemon trees natives ?

A. The orange and lemon are natives of Asia, but they have long been cultivated in the open fields in Spain, Portugal, and all the warmer portions of Europe; they are very handsome evergreens, and often adorn the greenhouses of this country, where they however, rarely attain to their natural size, or bring their fruit to perfection.

Q. What medical qualities do oranges possess ?

A. The juice of the orange is a grateful acid, of considerable use in fevers and inflammatory disorders, for allaying heat and quenching thirst; it is also of great efficacy in preventing and curing the scurvy: the outer yellow rind warms the stomach, and promotes appetite, and the flowers, which are extremely fragrant, are much used in perfumes.

Q. What do you remark of the lemon?

A. The lemon possesses similar medical virtues with the orange; but, as its acid is stronger, it is often employed to restrain vomiting: the juice as well as the rind, is also used in cookery, confectionary, &c.

## CHAPTER XXVII.

CLASS XIX. *Syngenesia*.

Q. WHAT plants are comprised in this class?

A. The nineteenth class, *Syngenesia*, contains plants bearing flowers which are termed compound, and which have many distinct florets on one common receptacle.

Q. What plant will you examine?

A. The plants of this class are very numerous, and easily procured; as the dandelion, thistle, blue-bottle, groundsel, colts-foot, &c., but the most pleasing specimen, perhaps, is the humble daisy, the common ornament of our fields during the summer months.

Q. Describe the general appearance of the daisy?

A. The daisy differs from any flower already examined, and is more interesting, as all those apparent white and pink petals, are in reality so many true flowers; and every one of those yellow spots in the middle is a real flower also.

Q. Examine one of the exterior white petals?

A. There is a long white part tipped with red, and at the lower end, by which it is fastened, appears a little tube, that contains a thread ending in two horns, which are the forked summit of the pistil.

Q. How are the florets of the centre constructed?

A. Each of these beautiful little florets, when expanded, has a corolla, shaped like the lily of the valley, with five stamens, which are united in the form of a tube, and surround a pistil that passes through them, and is forked at the summit.

Q. Describe the other parts of the daisy?

A. The whole of the florets are contained in a calyx composed of two rows of leaves, and stand upon a common receptacle, which is formed like a sugar loaf; here is no seed-vessel, but the little oval seeds are placed immediately below the yellow florets, and when these fall off, naked seeds remain attached to the receptacle.

Q. Are all the flowers of this class formed the same as the daisy?

A. All compound flowers bear a general resemblance to the daisy; but some have all their florets like those of the centre, as in the thistle; while in others the florets resemble those of the margin of the daisy, as the dandelion and sow-thistle.

NOTE.—The minute charms of these elegant little flowers, are best discovered with the aid of a magnifying glass.

The class Syngenesia has five orders:—

1. *Polygamia equalis*, in which each floret is perfect, that is, furnished with stamens and a pistil; as dandelion and sow-thistle.

Q. Are no native plants of this class cultivated in gardens?

A. Many ornamental and useful plants have been reclaimed from the field, where they originally grew wild; such as the common garden marygold, tansy, chamomile, and the elecampane, a medical plant, much esteemed for the aromatic bitterness of its root.

Q. What are the most remarkable exotics?

A. The foreign plants of this class most commonly met with, are, the sun-flower, the scarlet cardinal flower, the common artichoke, very generally eaten in the south of Europe, of which it is a native: and the Jerusalem artichoke, another species which produces tubes similar to the potatoe.

2. *Polygamia superflua*, distinguished by the florets of the centre, having perfect stamens and pistils, and those of the margin pistils only, as in the daisy.

3. *Polygamia frustranea*, having the florets of the centre perfect, but those of the margin destitute both of style and stamens; as in the sun-flower, and blue-bottle.

4. *Polygamia necessaria*, in this order the florets of the centre have stamens only, and those of the margin have pistils only; as in the garden marygold.

5. *Polygamia segregata*, comprehends such flowers as have tubular florets, all perfect, each floret having its own separate calyx, in addition to the general calyx, which includes all the florets; as the globe-thistle.



## CHAPTER XXVIII.

CLASS XX. *Gynandria*.

Q. How are plants of the class Gynandria distinguished?

A. The flowers of plants in the twentieth class, are formed in a peculiar manner, by the stamens growing upon the pistil itself.

Q. Of what plants is it composed?

A. The class gynandria consists chiefly of those beautiful tribes of flowers, the orchis and ophrys, much sought after by gardeners and florists, on account of their singular structure.

Q. Are any of them found wild in America?

A. There are many species of orchis growing wild, which may be commonly met with: that called orchis mascula, or early purple orchis, from its purple flowers, is found in woods and meadows, and is in blossom in April and May.

Q. Give me a description of the plant?

A. The stalk rises about a foot in height, and is purplish towards the top; the leaves are long, and usually marked with dark-colored spots; and the flowers terminate the stem in a long regular spike.

Q. Describe the construction of the flower?

A. The corolla of the orchis is composed

of five petals, two of which are upright, of an oval pointed shape, with their lips bent inwards, and the other three are placed above it, so as to form the helmet; the lip is large, and divided into three lobes; and the nectary is lengthened out behind into a tubular part, resembling a little horn.

Q. What is the character that distinguishes it as belonging to this class?

A. The orchis is included in the twentieth class, from having its two short filaments inserted into the germen; the anthers are curiously incased in the limb of the nectary; and the germen is oblong and twisted, with a short style and compressed summit.

Q. What other specimens are there?

A. In this class may be also examined the ladies-slipper, the birthwort, and the curious arum, whose sheathed flower is succeeded by clusters of bright scarlet berries, which make a conspicuous appearance under the hedges where they commonly grow.

NOTE.—Gynandria contains seven orders :

1. *Monandria*, one stamen, contains the orchis tribe.
2. *Diandria*, two stamens as in the ladies-slipper.
3. *Triandria*, three stamens.
4. *Tetrundria*, four stamens.
5. *Pentandria*, five stamens.
6. *Hexundria*, six stamens, contains the very extraordinary genus of birthwort.
7. *Octandria*, eight stamens.

## CHAPTER XXIX.

CLASS XXI. *Monœcia.*

Q. WHAT plants are in the twenty-first class?

A. The twenty-first class is composed of plants having stamens and pistils in separate flowers, both growing on the same plant.

Q. Mention some of ths plants?

A. The class *Monœcia* contains many curious and important trees and plants: among the latter, are the cucumber, melon, and others of the gourd tribe; the sedge, bull-rush, arrow-head, maize, or Indian corn, and that ill natured plant, the stinging nettle.

Q. What is Indian corn?

A. Indian corn, or maize, is a very valuable American plant, cultivated in many countries for the sake of its seed, which, when ground, produces more flour than any other kind of corn: the stalk is jointed like the sugar cane, and bears large ears, upon which the grains are fixed in naked rows.

Q. What are the trees of this class?

A. Some of our most valuable trees belong to this class; as the oak, the pine, beech, birch, hazel, box, mulberry, walnut, and horn-beam.

Q. What are the flowers of the oak?

A. In the oak tree the stamens are on a catkin, a sort of spike composed of flowers and chaff; and the pistils are sitting in buds attached to the branches: the same may be seen in the hazel and beech trees. *See plate.*

Q. For what is the oak remarkable?

A. The oak is remarkably long lived, and attains to so great a size, that when full grown, it has measured above 70 feet in circumference: it is the most important of trees, as, by uniting hardness with such a degree of toughness as not easily to splinter, it has long been justly preferred for the purpose of building ships.

Q. To what other uses is it applied?

A. The bark of the oak is universally used in the tanning of leather; and the acorns or fruit which contains the seed, are good for

NOTE.—The twenty-first class has nine orders, which are also formed from the number of stamens:—

1. *Monandria*, one stamen.
2. *Diandria*, two stamens, contains the willows.
3. *Triandria*, three stamens, the numerous tribe of sedges.
4. *Tetandria*, four stamens, contains the nettle, the mulberry, alder, box, and birch trees.
5. *Pentandria*, five stamens, contains the lesser burdock.
6. *Hexandria*, six stamens.
7. *Polyandria*, more than seven stamens, contains the oak, beech, walnut, hazel, hornbeam, and plane trees; arrow-head, and arum or cuckoo-pint.
8. *Monadelphina*, the stamens united by their filaments into one set, contains the pine or fir trees.
9. *Polyadelphia*, the stamens united into more than two sets, as in the gourd tribe.

fattening hogs and deer ; oak saw-dust is the principal vegetable ingredient used in dying fustians, and all the different shades of drab and brown color.

Q. What are the light spongy bodies called oak-apples ?

A. The excrescences that grow from the leaves, and other tender parts of the tree, are occasioned by little insects, which wound the surface in order to deposite their eggs : their proper name is galls : and those brought from the southern parts of Europe, are the principal substance used in making the ink, used in writing.

Q. Is not cork obtained from a species of the oak ?

A. The elastic substance called cork, so serviceable in stopping bottles, &c. is the outer bark of a species of oak growing in the south of Europe, and north of Africa : the tree is unserviceable till it is 25 years old ; but from that time it continues every tenth year to yield good cork, during nearly 200 years.

Q. What name is given to the wood of the pine ?

A. The wood of the Scotch pine, or fir, is very smooth and light, and called red deal ; the common white deal is produced by the Norway pine : the famous cedar of Lebanon, is a species of pine growing on the mountains

of Syria, especially on Mount Lebanon, from which it takes its name.

Q. What useful substances are procured from these trees?

A. Pitch, turpentine, and rosin, are obtained from the Norway pine; and the Scotch fir, when cut in pieces, and enclosed in a large oven, constructed for the purpose, with a channel at the bottom, yields the substance called tar.

Q. For what is box-wood used?

A. The box-tree is an evergreen, rising to the height of 10 or 12 feet: it is very slow in growing, which renders the wood hard, heavy, and of great value for making musical and mathematical instruments, handles of tools, and the finer kinds of turnery ware.

Q. Of what country is the mulberry tree a native?

A. The mulberry tree is a native of Italy, and is now cultivated in most parts of Europe and America, not only for the grateful fruit which it affords, but in many places for the more lucrative purpose of supplying silk worms with its leaves, upon which they feed.

Q. For what is the wood of the walnut tree chiefly used?

A. The wood of the walnut is of a dark color, beautifully variegated, and by being hard enough to admit of polishing, is generally used for making gun stocks: it was also much



used by cabinet makers, before the introduction of mahogany.

Q. What are the most remarkable plants of foreign countries?

A. Among the foreign plants may be noticed the cocoa-nut tree, the bread-fruit tree, the siphonia or Indian-rubber tree, and the tallow tree.

Q. Describe the cocoa-nut tree?

A. The cocoa-nut tree is a native of the East Indies, and attains to the height of 60 feet: it makes a very grand appearance, the tops of the stems being crowned with tufts of leaves from 10 to 15 feet long, and bearing clusters of nuts nearly as large as a man's head, the inner part of which is well known in this country.

Q. What is the bread-fruit tree?

A. The bread-fruit tree bears fruit about the size of a child's head, which supplies the inhabitants of the South Sea Islands with abundance of wholesome food during the greatest part of the year; they also clothe themselves with cloth made of the bark; and the wood serves for building their huts and canoes.

Q. How is Indian-rubber procured?

A. Indian-rubber, or cautchuc, is an elastic rosin, that oozes out under the form of a vegetable milk, from incisions made in trees growing in the West Indies, Brazil, the East Indies

and China ; it thickens and hardens gradually on exposure to the air ; and although it usually comes to us in the shape of little bottles, it will take any other form, by covering moulds of clay with the liquid juice.

Q. What is remarkable of the tallow tree ?

A. The tallow tree grows in China, and is about the height of a common cherry tree : it is remarkable for producing berries, from which a green wax is obtained, that is manufactured into candles ; but it has a strong smell, and does not afford so clear a light as the common tallow.

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## CHAPTER XXX.

### CLASS XXII. *Diœcia*.

Q. WHAT plants constitute the twenty-second class (*Diœcia*) ?

A. The twenty-second class has the plants of which the stamens and pistils are in separate

NOTE.—*Indian-rubber*.—The American Indians made boots with it, which water cannot penetrate, and which, when smoked, have the appearance of real leather. Torches are made of it, which give a beautiful light, without any disagreeable smell ; and the inhabitants of Quito prepare from it a kind of cloth, which they apply to the same purpose as our oil-cloth. It is now extensively manufactured into shoes, both in this country and in England, and in other countries. It is also useful in rubbing out black-lead pencil marks.

flowers, situated on two separate plants; as may be seen in the yew, which possesses the best flowers to illustrate this class.

Q. What plants does it contain?

A. In the list of plants may be noticed the hop, spinach, juniper, butcher's-broom, mistletoe, hemp, and the willow and poplar trees.

Q. For what is the hop used?

A. The hop is cultivated for giving an agreeable bitter to malt liquor; the part used is a sort of catkin, which contains the flowers that have pistils.

Q. What is the juniper?

A. Juniper is an evergreen prickly shrub, growing in several healthy parts of England, and other countries, from whose berries the well known spirituous liquor called gin is prepared.

Q. What is remarkable of the mistletoe?

A. The mistletoe is a parasitical evergreen shrub, commonly growing on apple, oak, and

NOTE.—The twenty-second class has eight orders:

1. *Monandria*, one stamen.
2. *Diandria*, two stamens, contains the willow.
3. *Triandria*, three stamens as in the crowberry.
4. *Tetrandria*, four stamens, contains the mistletoe, and gale or Dutch myrtle.
5. *Pentandria*, five stamens, has the hop, hemp, and spinach.
6. *Hexandria*, six stamens, contains black briony.
7. *Polyandria*, many stamens, as in the poplar.
8. *Monadelphia*, the stamens united into one set, contains the juniper and the yew.

other trees, and retaining its white smooth berries throughout the winter; it will not take root in the ground, but if the ripe berries be rubbed into the apertures of the bark of almost any tree, they will produce plants the following winter.

Q. For what is hemp employed?

A. Hemp, though cultivated in this country, was originally a native of the warm climate of India. The best hemp is now produced in Russia; though a very excellent quality grows in the United States. Ropes and sail-cloth are made of hemp; and the seed is useful for feeding birds and poultry.

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## CHAPTER XXXI.

### CLASS XXIII. *Polygamia.*

Q. How is the twenty-third class distinguished?

A. The character of the class *Polygamia* consists in having some flowers with stamens only, others with pistils only, and some with all their parts perfect; and these are placed

NOTE.—Hemp is sown in March, and is fit for harvest in October; it is then pulled up and soaked in water, for the purpose of separating the tough rind or outer coating from the woody parts of the stalk; after it has been combed, dried and reduced to different fineness of texture, it is spun for various purposes.

either on the same plant, or on two or three different ones.

Q. What plant will serve to exemplify the class?

A. These distinctions may be seen in the ash, which bears perfect flowers only on one tree, and flowers with pistils only, on others: each sort of blossom, however, is usually accompanied by some few of the other.

Q. What other plants are there?

A. There are the wall pellitory, one of the most common of British plants, growing on old walls, and flowering from May till September; the common fig-tree, the plantain tree, the acacia, and the sensitive plant.

Q. Describe the pellitory?

A. The pellitory has a rough upright stem, reddish, and furnished with long spreading branches; the flowers are small, of a greenish color tinged with red, and placed in clusters round the foot-stalks of the leaves.

Q. What is remarkable of the fig-tree?

A. The fig-tree has no apparent flower, but the fruit, in its early stage, has the inner sur-

NOTE.—The twenty-third class, Polygamia, has three orders:

1. *Monœcia*, having united flowers, accompanied with barren or fertile flowers, or both, all on the same; as in orache pellitory.

2. *Diœcia*, having the different flowers on two separate plants.

3. *Triœcia*, the same on three separate plants.

face covered with little florets, which can only be discovered by opening it: it is a native of the south of Europe, but will ripen its fruit in England, and in many parts of the United States, if screened from the north-east wind.

Q. Where does the plantain-tree grow?

A. The plantain-tree grows in all the West India Islands, and is one of the greatest blessings of the inhabitants: the stalk rises to the height of 20 feet, and at the top produces leaves often eight feet long, but remarkably thin and tender.

Q. In what manner is this tree so useful?

A. The fruit or plantains are an excellent substitute for bread, and are used as such chiefly by the negroes; they are about a foot long, and from three to six inches round, with a tough skin, under which is the soft pulp, that is roasted and eaten: every other part of the tree is also applied to some useful purpose.

Q. What is the acacia?

A. The acacia is a tree growing in Arabia and Egypt, from which gum arabic exudes in a liquid state, in a similar manner to the gum that is often produced upon the cherry and other trees in this country; and by exposure to the air, it soon acquires solidity and hardness.

Q. What are the singular properties of the sensitive plant?



A. *Mimosa pudica*, or the sensitive plant, is a native of Brazil; but it is now commonly found in the hot-houses of this country; it is remarkable for the power which it possesses of contracting its leaves or branches when touched.



## CHAPTER XXXII.

### CLASS XXIV. *Cryptogamia*.

Q. WHAT is the character of the concluding class of the Linnæan system?

A. The class *Cryptogamia*, comprehends all plants whose flowers are either imperfectly or not at all known, or not capable of being numbered with any precision.

Q. What are these plants?

A. The *cryptogamus* plants are ferns, mosses, liverworts, flags and mushrooms.

Q. What are ferns?

A. Ferns are well known plants growing about the borders of woods near rivulets, and in stony, rocky places, distinguished by the form of their leaves, which are shaped like

NOTE.—The orders of the twenty-fourth class are natural orders or families. 1. *Filices*, or ferns; 2. *Musci*, or mosses; 3. *Hepaticæ*, or liverworts; 4. *Algæ*, or flags; and 5. *Fungi*, or mushrooms.

the end of a lance, and divided into a great number of lobes or second leaves.

Q. Do they not produce any flowers?

A. What is called the fructification or seed-vessels of ferns, is generally disposed in spots, or parallel lines at the back of the leaf; as may be seen in the common brake and spleenwort, found on old walls, stumps and roots of trees, and shady places.

Q. What is remarkable of mosses?

A. Mosses, interesting little evergreens, are really herbs with distinct leaves, and frequently as distinct a stem: they are found in the hottest and coldest climates, and have the singular property of reviving with moisture, however much dried up.

Q. How are they constructed?

A. The structure of mosses is equally curious and beautiful, but too minute to be observed without the aid of a magnifier: they have both stamens and pistils, enclosed in a little roundish body that grows out of the bottom of the leaves, and which when the seed ripens falls off.

Q. What are liverworts?

A. Lichens, or liverworts, are fleshy or leather-like substances, growing on rocks, trees, and old buildings: the most common species may be observed in the form of a rough, yellow and bluish crust on gooseberry bushes,

and old park-palings, to which they impart a picturesque appearance.

Q. Are they applied to any useful purpose?

A. The fine purple color called orchil, is extracted from a valuable species of lichen, found in the Archipelago; and several other kinds afford beautiful dyes: the rein-deer, lichen or moss, grows in Lapland to the height of a foot, and is the principal food of the useful animal whose name it bears.

Q. What plants are included under the term *algæ*, or flags?

A. The aquatic *algæ* are the sea-weeds or marine plants, which derive their nourishment by their surface being either fixed by their roots to stones or rocks, or floating about without being attached to anything.

Q. Describe the fungi?

A. The fungi, or mushrooms, are a singular tribe of plants, without branches, leaves, or flowers, and scarcely any root: their substance is fleshy, generally of quick growth, and short duration, and differing in firmness from a

NOTE.—The rein-deer resembles the stag, and is admirably suited by Providence to the frozen regions of the north, where the inhabitants could not exist without it. It answers the purpose of a horse, by drawing them in sledges over regions covered with snow; its flesh and milk afford them food; its skin clothing; and its bones, sinews, and intestines, are converted into many useful articles.

watery pulp to a leathery or even woody texture.

Q. Are not some of them poisonous?

A. Numerous instances have occurred of the fatal effects arising from the imprudent use of fungi: when the poisonous symptoms show themselves, vomiting should be immediately excited by means of an emetic, and then vegetable acids should be given, either vinegar, lemon-juice, or that of apples.

Q. Describe the eatable mushroom?

A. The only kind of mushroom that may be eaten with safety, is the *agaricus campestris*, or common mushroom, which grows wild in parks and uncultivated fields, and is often produced in hot-beds: when it first appears above the ground, it is round and smooth, and in expanding discovers a white stalk covered with a sort of cap, beneath which are flat thin substances, disposed edgeways, called gills, of a pink hue when young, but afterwards of a dark liver color.

Q. What other substances belong to the tribe of fungi?

A. With the fungi are classed morels, truffles, and puff-balls; and the different sorts of mushrooms, whose rise causes those circles in meadows called fairy rings.

NOTE.—Some authors followed a different system, and only enumerated twenty-one or two classes; we have followed the system of Linnæus, and have given twenty-four.

## CHAPTER XXXIII.

*The Habits of Plants.*

Q. WHAT is meant by the habits of plants?

A. It is that disposition which plants show for peculiar soils and situations, even in the same climate; while almost every climate has its own diversity of vegetables.

Q. What is the arrangement of plants with regard to their habits?

A. They are generally arranged under six heads, as follows:—1, Aquatic; 2, Alpine; 3, Hilly; 4, Shady; 5, Campaign; and 6, Parasitical plants.

Q. What are *aquatic plants*?

A. Aquatic plants are those that grow in the water: such as the grass-wrack, sea perslane, sea wort, sea holly, sea lavender, sea plantain, and many others. In lakes and ponds we find the water lily, water milfoil, pond weed, water violet, flowering rush, and many others.

Q. What are the *alpine plants*?

A. The alpine plants, so called from the Alps in Switzerland, are such as grow on the sides, or on the tops of high mountains. Of this description are the mountain strawberry, rose wort, globe flower, &c.

Q. What are *hilly plants*?

A. They are such as are found on dry, sandy and gravelly hills, scorched with the sun. The hawthorn, dog-rose, creeping trefoil, are examples of this class. On dry declivities may be found the mountain ash, garden plum, honey suckle, the beautiful rose, &c.

Q. What are *shady plants*?

A. Shady plants are those that are found in shady groves: such as the beech, the ash, hazel, buckthorn, sweet brier, blackberry, May lily, &c.

Q. What are *campaign plants*?

A. Campaign plants are those that are found on heaths, commons, and fields: such as the dewberry-bush, wormwood, plantain nettle, henbane, &c.

Q. What are *parasitical plants*?

A. Parasitical plants are such as grow on the trunks and branches of trees: as the mistletoe, ophrys, toothwart, &c., besides various kinds of mosses, lichens, and the like.

Q. In conclusion what have you to observe of plants?

A. Plants and vegetables are so useful that without them neither men nor animals could be supported. They furnish us not only with food, but also with medicine. They supply us with materials for building houses, ships, &c.; for dying and tanning; for painting; for raiment, as flax and cotton; for com-



merce ; they contribute to our pleasure and ornament ; and, in a word, they are applicable to every purpose of life :

Say, what impels, amid surrounding snow,  
Congealed, the Crocus' flamy bud to grow ?  
Say, what retards amid the summer's blaze,  
The autumnal flower, till pale declining days ?  
The GOD OF SEASONS, whose pervading power,  
Controls the sun, and sheds the fleecy shower ;  
He bids each flower his quick'ning word obey,  
Or to each lingering bloom enjoins delay.

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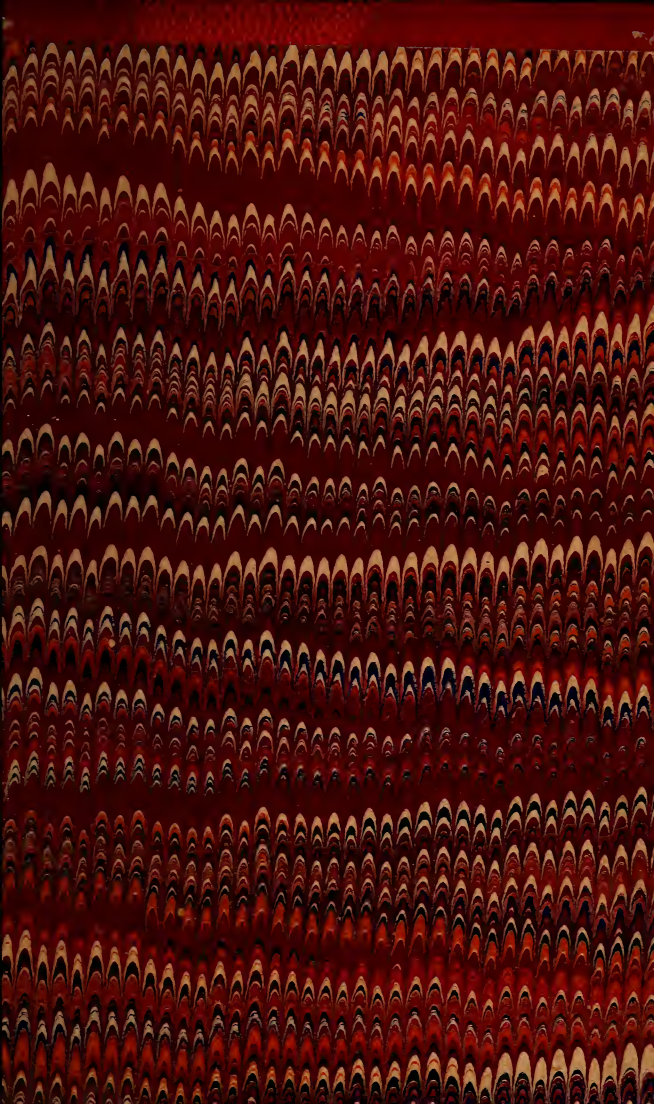
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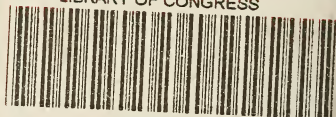








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